

Cylindrocladium Root and Crown Rot of Roses¹

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INTRODUCTION: Roses are known worldwide for their fragrant showy blooms. They lend an attractive accent to most any garden setting when used in outdoor landscapes. The modern rose types which most people are familiar with are the result of extensive interspecific hybridization. Dwarf roses also have a complicated lineage. Those known as Miniatures are derived from crosses between Hybrid Teas and *Rosa chinensis* Jacq. The Polyanthas are derived from *Rosa x rehderana* Blackburn (*Rosa chinensis* x *R. multiflora* Thunb. ex Murray). Polyanthas include the "sweetheart rose" while the Miniatures include the "fairy rose" and the "pygmy rose". These dwarf roses are propagated from cuttings and are typically grown in greenhouses. This method of propagation is relatively simple; however, the risk of disease development can be quite high depending on cultural and management practices (Horst 1983).

SYMPTOMS: Symptoms of *Cylindrocladium* root and crown rot typically consist of rotted roots, necrotic crown and stem tissues, and wilted chlorotic foliage (Fig. 1). The foliage may not always develop chlorosis in the early stages of this disease. Eventually, the foliage will dieback, abscise, and *Cylindrocladium* spp. may begin to sporulate on necrotic crown and stem tissue. *Cylindrocladium* spp. attack both rooted and unrooted cuttings. This disease can spread easily throughout a propagation bed or between pots. It is very difficult to control once established in a greenhouse or nursery operation. The pathogen may reside in contaminated potting soil, plant material, or on hands, clothing or propagation tools. Fungal inoculum associated with diseased cuttings, leaf litter, and plant debris also poses the threat of secondary infection and spread of the disease.



Fig. 1. The necrosis of root, crown and stem tissue and subsequent wilted foliage are common symptoms associated with *Cylindrocladium* root and crown rot of roses. A progression of disease symptoms can be observed from left to right.

PATHOGEN: Three species of *Cylindrocladium* have been associated with root and crown rot of roses in Florida. *Cylindrocladium scoparium* Morgan and *C. floridanum* Sobers & C.P. Seymour are recovered most often from symptomatic roses. *Cylindrocladium parasiticum* Crous, Wingfield & Alfenas has also been isolated from rotted rose cuttings, however, pathogenicity of this fungus on *Rosa* spp. has not been established (Alfieri *et al.* 1994).

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Separation of these *Cylindrocladium* spp. can be easily achieved using a compound microscope equipped with an ocular micrometer. Spore size, septation of spores and vesicle shape are the main criteria used to distinguish the difference among these three pathogens. *Cylindrocladium scoparium* always produces 1-septate conidia (33-59 pm x 3-4 pm). The vesicle shape of *C. scoparium* may be oval to ellipsoidal or umbonate on main and lateral filaments (Peerally 1991). *C. floridanum* produces 1-septate conidia (average size = 41 pm x 4 pm) and sphaeropedunculate vesicles on main and lateral filaments (Peerally 1991). *Cylindrocladium parasiticum* produces 1-3 septate conidia (average size = 62-79 pm x 6 pm). The vesicles of *C. parasiticum* are sphaeropedunculate, but are produced only on the main filaments (Crous *et al.* 1993).

CONTROL: Proper cultural practice is the most important disease control strategy for *Cylindrocladium* root and crown rot. Stock plants must be healthy and free of disease. Cuttings should never be taken from plants exhibiting symptoms of wilt, chlorosis or dieback. Remove diseased stock plants and discard or destroy them well away from propagation or cutting production areas. Diseased plant material within any flats or pots should be removed and destroyed. Contaminated potting soil should be discarded and pots should be soaked in a 10% solution of commercial laundry bleach for approximately 30 minutes if they are to be reused in rose production areas (Hanan *et al.* 1978). Propagation tools should be frequently cleaned and sterilized. Hands should be washed with an antimicrobial soap when moving from one production area to another to avoid the spread of fungal inoculum. These cultural controls are especially effective when used in conjunction with the proper chemical control regime. There are several systemic fungicides containing thiophanate methyl, which may be used on fresh cuttings or established rose plants (Simone *et al.* 1993): Cleary 3336 (50% WP, 42% F), FungoFlo (46.2%), Fungo 85 WP, Domain Fl (46.2%) and SysTec 1998 (46.2% F). Cuttings may be dipped before sticking. Rooted cuttings may be drenched to protect the root system against infection. When using any pesticide, the applicator must follow label directions.

SURVEY & DETECTION: When inspecting rose cuttings for the presence of this disease, randomly remove established cuttings from flats or pots and check for rotted root tissue and necrotic stems. *Cylindrocladium* spp. sporulate readily on infected tissues. Fungal growth usually appears as a white powdery residue. With the aid of a hand lens or dissecting microscope, the fungus is observed as white tufts, with the spore-producing phialides and conidia appearing as tiny candelabrum-shaped structures.

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